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10/718,466	11/19/2003	Teng-Chun Tsai	JCLA11486	1034

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J C PATENTS, INC.
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EXAMINER

NGUYEN, GEORGE BINH MINH

ART UNIT	PAPER NUMBER
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3723

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/718,466

Applicant(s)

TSAI ET AL.

Examiner

George Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on January 18, 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-9 and 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-9 and 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Receipt is acknowledged of Applicant's amendment filed on January 18, 2005.

Claims 5, 10, and 21 were canceled. Thus, claims 1-4, 6-9, and 11-20 are pending for examination.

Claim Rejections - 35 USC § 102

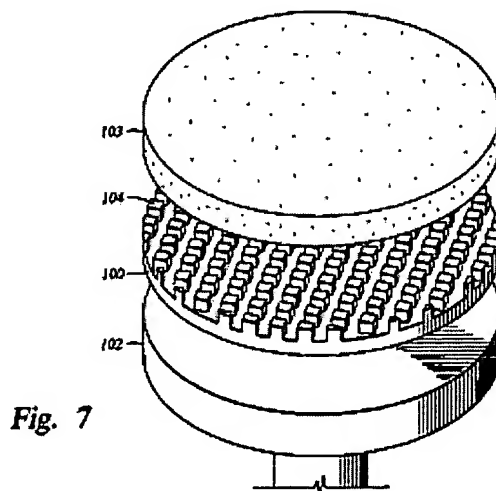
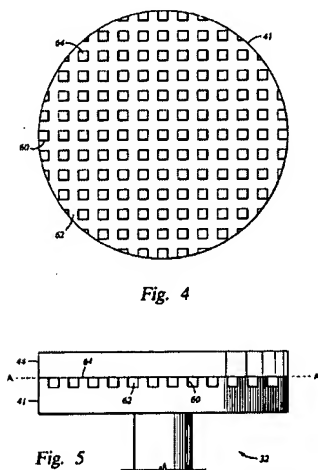
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 6, 8, 11-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tolles et al.'6,220.942.

With reference to Figures 4, 5, and 7, Tolles discloses the claimed invention. Please note that in Figure 7, polishing pad 103 is shown with abrasive grains embedded therein. Thus, Tolles shows a fixed abrasive pad set up over a polishing sub-pad 100.



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FIG. 4 shows a preferred embodiment of a platen 41 of the invention. The platen 41 comprises a patterned surface whereon a polishing pad may be disposed. Generally, the patterned surface has features formed therein defining a raised area and a recessed area. In the embodiment shown in FIG. 4, the raised area consists of a plurality of protrusions 60 while the recessed area is a plurality of intersecting grooves 62 defined by the protrusions 60. More specifically, the recessed area consists of two parallel sets of equally spaced orthogonally intersecting grooves 62 in a checkerboard pattern. Each groove 62 traverses the upper surface of the platen 41 from one perimeter to the another. Thus, the grooves 62 are not contained, or blocked, at either end. However, the present invention also contemplates an embodiment having blocked grooves.

The raised area of the platen 41, or protrusions 60, defines a pad mounting surface. Preferably, the protrusions 60 cooperate to provide a substantially planar mounting surface 64 along a common plane A for supporting a polishing pad 44 as shown in FIG. 3. The pad 44 is attached using a commercially available pressure sensitive adhesive (PSA). Thus, the present invention eliminates the bottom pad of prior art as discussed with reference to FIG. 1. Further, the necessary pad compliance, previously achieved by using a bottom pad, is now provided by the cooperation of the recessed and raised areas, or grooves 62 and protrusions 60, respectively. The protrusions 60 ensure sufficient rigidity (or stiffness) while the grooves 62 allow the proper proportion of pad compliance to accommodate a substrate's varying topography.

As noted above, the grooves 62 are preferably open at some point along their length to prevent vacuum adherence of the pad to the surface. Thus, the grooves 62 provide pathways between the platen 41 and the pad 44 which vent to the environment of the platen 41 as shown in FIG. 3. Such a construction anticipates the use of perforated pads such as those available from Rodex. The perforations in the pad allow fluid flow therethrough. Where the grooves 62 are isolated from the environment, such as where the grooves 62 comprise concentric circles enclosed at the top by a perforated pad, a partial vacuum condition may be created in the grooves 62 as a substrate is urged against the pad. In such a case, the substrate remains clucked to the pad after the polishing cycle making it difficult to remove. By constructing the grooves 62 as shown in FIGS. 4 and 5, the grooves 62 remain at equal pressure to the ambient environment allowing easy dechucking of the substrate. Where a concentric pattern is desired, a vent channel or channels extending to the perimeter of the platen 41 can be provided to eliminate adhesion between the substrate and platen 41. Such an embodiment is shown in FIG. 6 and described in detail below.

Preferably, the protrusions 60 and the grooves 62 shown in FIGS. 4 and 5 are defined by machining away a portion of the upper surface of the platen 41 which comprises a metal such as aluminum. However, the present invention also contemplates alternative embodiments. For example, the plurality of protrusions 60 may be constructed separately from the platen 41. The protrusions 60 may then be secured to the platen 41 surface by conventional methods such as brazing or welding. In another alternative, the platen 41 may comprise two separable plates with a lower plate secured to the motor 46 (shown in FIG. 3) and an upper plate comprising the patterned surface for mounting the pad 44. The plates may be permanently coupled by such methods as welding, or they may be detachably coupled by temporary fasteners or clamps. The latter embodiment provides a versatile platen assembly having an exchangeable mounting surface.

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The dimensions of the patterned surface may be varied to achieve the desired proportions of compliance and rigidity. In general, the mounting surface 64 makes up to between about 20 to 95% of the total upper surface area but may be varied according to the pad thickness and modulus, as well as the applied polishing pressure. In a specific embodiment shown in FIG. 4 having a diameter of about twenty (20) inches, the groove depth is about 0.250 inches and the groove width is about 0.062 inches. Thus, the total surface area of the mounting area 64 is preferably about 20-95% of the total area of the platen. The diameter of the platen 41 may be varied to accommodate any substrate size such as 100 mm, 200 mm or 300 mm substrates. As a result, relative sizes of the grooves and protrusions will vary accordingly.

It is to be understood that the present invention allows for virtually limitless design variations. FIG. 4 and 5 show only one possible embodiment according to the invention. Another embodiment is shown in FIG. 6. In general, the embodiment of FIG. 6 provides a raised area and recessed area of the platen 41. Specifically, the platen 41 comprises a plurality of "broken" concentric grooves 65 intersected by radial grooves 66. The radial grooves 66 originate at a central hub 67 thereby communicating all of the features of the recessed area. The embodiments described above are merely illustrative and a person skilled in the art will recognize other embodiments within the scope of the present invention.

In addition to patterning the upper surface of the platen, a patterned mat, liner or other coating could be applied to or disposed over a typical platen as shown in FIGS. 7 and 8. A hard rubber-like coating could be molded or otherwise formed to provide one of the patterned surfaces described above. Thus, FIG. 7 shows a patterned mat 100 disposed on a platen 102 and having a polishing pad 103 disposed on an upper patterned mounting surface 104. In the specific embodiment shown, the patterned mat 100 has a surface profile similar to that of the platen 41 shown in FIG. 4 and described above, however, any pattern may be used to advantage. In such an embodiment, the platen 102 preferably comprises an untextured mounting surface (as shown in FIG. 7) for securing the patterned mat 100 thereto but may also comprise a patterned surface to cooperate with the patterned mat 100 in providing additional flexibility and compliance. The polishing pad 103, patterned mat 100, and platen 102 are secured to one another by any conventional methods such as by an adhesive.

FIG. 8 is a partial cross sectional view of an alternative embodiment comprising a coating 110 disposed on a patterned platen 112. The particular surface profile of the platen 112 shown in FIG. 8 is similar to that of the platen 41 shown in FIG. 4 but it is to be understood that any pattern may be used to advantage, such as those shown in FIGS. 4-7. The coating 110 may be secured to the platen 112 by conventional methods such as by an adhesive. A polishing pad (not shown) may then be secured to the upper mounting surface 114 defined by the coating 110 and platen 112.

The material used for the patterned mat 100 and coating 110 is preferably determined according to the material of the platen. In general, the patterned mat 100 and coating 110 comprise a material more compliant than the platen. For example, where the platen is made of a metal, such as aluminum or stainless steel, the patterned mat 100 and coating 110 may comprise an elastomer such as rubber. Other materials which are known and unknown could be used to advantage.

It is to be understood that terms such as top, bottom, below, above, backside and the like are relative terms and

2. Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tolles et al.'6,217,426.

With reference to Figures 4, 5, 7, 9, and 11, Tolles discloses the claimed invention.

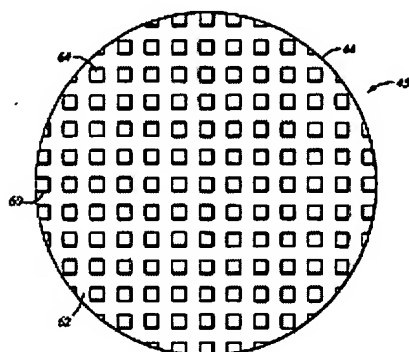


Fig. 4

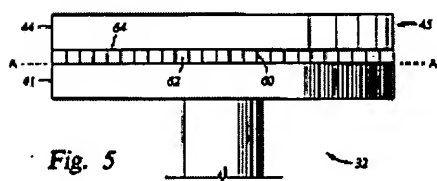


Fig. 5

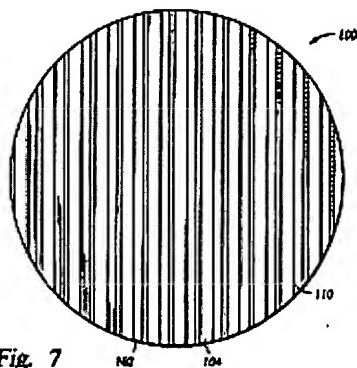


Fig. 7

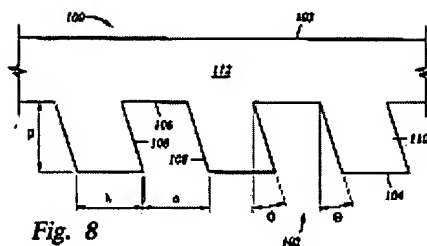
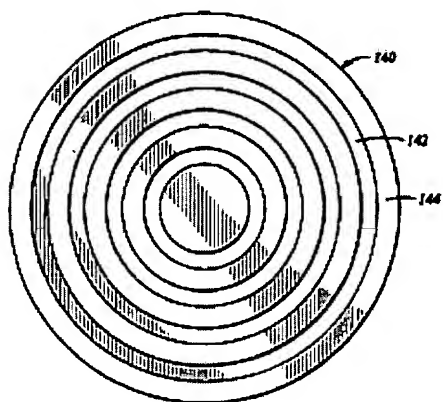


Fig. 8



With reference to FIG. 3, the CMP system also includes
 25 a chemical supply system 54 for introducing a chemical
 slurry of a desired composition to the polishing pad. In some
 applications, the slurry provides an abrasive material which
 facilitates the polishing of the substrate surface, and is
 preferably a composition formed of solid alumina or silica.
 30 During operation, the chemical supply system 54 introduces
 the slurry, as indicated by arrow 56, on the pad assembly 45
 at a selected rate. In other applications the pad assembly 45
 may have abrasive particles disposed thereon and require
 only that a liquid, such as deionized water, be delivered to
 35 the polishing surface of the pad assembly 45.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-4, 7, 9, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tolles et al.'942 in view of Wang'6,666,751 and Tolles et al.'426. Tolles et al.'942 has been discussed above, but does not disclose that both surfaces of the sub-polishing pad are undulating.

With reference to Figure 10, Wang discloses that the sub-polishing pad 95 having undulating interfacing surface 101 with the polishing platen 88. The advantage is to significantly enhance the polishing uniformity of the CMP process and substantially reduces any edge effects.

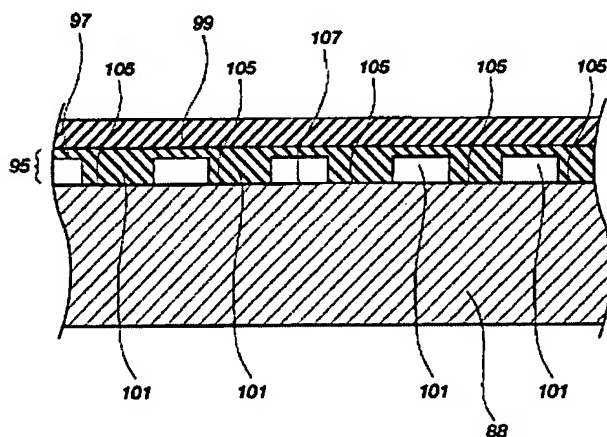


Fig. 10

5. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the sub-polishing pad of Tolles with platen interfacing surface having undulating surface as taught by Wang in order to significantly enhance the polishing uniformity of the CMP process and substantially reduces any edge effects.

Regarding to claims 3, 9, 13, 16, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the undulating surface of Tolles'942 with different groove configuration as taught by Tolles'426 in order to significantly enhance the polishing uniformity.

Response to Arguments

6. Applicant's arguments filed January 18, 2005 have been fully considered but they are not persuasive.

7. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

8. In response to applicant's argument that the references do not teach a fixed abrasive pad as set forth in the claims. The examiner disagrees because the references clearly disclose a fixed abrasive pad as described in the above 102 rejection.

9. In response to applicant's argument that the combination of references does not support a prima facie of obviousness because they do not solve the same problem, the examiner disagrees because, in reference to MPEP 2144, it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. Thus, the 103 rejection deems to be proper.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

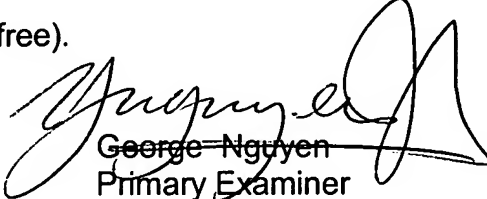
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 571-272-4491. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 571-272-4485. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Nguyen
Primary Examiner


George Nguyen
Primary Examiner
Art Unit 3723

GN – February 28, 2005